

CLAIMS

1.- A building panel and plant for the manufacture thereof, to be
5 precise, a lightweight panel (1, 21) for external or internal closures of
latticework support structures (18, 25), formed by uprights (18, 26)
connected by horizontal crossmembers (27), which panel is formed by
slabs (6, 22) of air-setting resistant material, reinforced in the façade panels
for external closures and unreinforced for the dividing panels of internal
10 closures, which have a patterned surface on the visible face (3, 22A) and a
smooth or shaped surface at the edges (3a, 22B) thereof, which surface is
formed by a thin layer (2, 49) of a synthetic resin or a fine mortar paste,
said layer (2, 49) being formed as a shell partially enveloping a body (6,
22) of air-setting resistant material on which it confers a quality finish of
15 architectural type with essential properties of resistance to weathering and
environmental pollution and being formed in molding arrangements
constituted by a mold-holder (51) having an engraved bottom wall, on
which there is seated the mold (52) forming the pattern of the visible face,
the mold being made of polyurethane, silicone, etc and surrounded by side
20 members (53) shaping the edges (3a, 22B) of the slabs (6, 22), said shell,
after solidification, forming the mold for the said air-setting resistant
material, wherein the molded synthetic resin layer (3, 22A), arranged in
shell-like fashion in the panel (1, 21) comprises over the whole of the inner
surface thereof an internal layer (4), also of synthetic resin, having the
25 whole of the free surface thereof covered with a solid bulk material (5), the
components of which, being partly firmly anchored in said internal layer (4)
provide a substantial free surface for the anchorage of the air-setting
material forming the resistant body (6, 22) poured thereover, which fills the
entire volume of said panel shell, at the same time as it includes therein
30 reinforcement means (7A, 7B, 23) provided with points directly accessible
from the outside of the concealed face (8, 22C) of the panel (1, 21).

2.- The panel of claim 1, wherein the solid bulk material (5) is
formed by an aggregate having a large specific surface area.

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3.- The panel of claim 2, wherein the large specific surface area aggregate consists of a sand formed by sharp-edged angular, preferably non-eroded grains.

5 4.- The panel of claim 1, wherein the points of the reinforcement means (7A, 7B,23) accessible from the outside are located in such way that they clearly project out from the surface of the concealed face (8, 22C) of the panel (1, 21).

10 5.- The panel of claim 4, wherein the points of the reinforcement means (7A, 7B,23) accessible from the outside are formed by portions of said reinforcement means emerging from the resistant body of the panel on the concealed face (8, 22C) thereof.

15 6.- The panel of claim 4, wherein the reinforcement means (7A, 7B,23) comprise top-hat-shaped metal sections having a portion (9, 24) of the U-shaped part thereof extending from the surface of the concealed face (8, 22C) of the panel (1, 21), and the brim portions (10) engaging the surface comprising the solid bulk material (5).

20 *SUB A2* 7.- The panel of claims 1 and 4, wherein the reinforcement means (7B) comprise metal sections constituting the visible face (12) of the edges (3a) of the panel (1).

25 8.- The panel of claims 4 and 7, wherein the section (7B) constituting the edges of the panel is an angle section and the web (12) thereof is wider than the thickness of the edges and is folded orthogonally parallel to the surface of the concealed face of the panel to form an anchorage tab (13), which may have a stiffening flange (14) directed towards the surface of said concealed face (8) of the panel (1).

9.- The panel of claim 6, wherein the brim portions (10) of the top-hat-shaped sections (7A) are attached to the surface comprising the solid bulk material (5) on which they are seated by a filler material (11).

30 *SUB A3* 10.- The panel of claims 6 and 7, wherein the metal sections (7A, 7B, 23) are provided with apertures (15) in the webs and/or seating wings thereof allowing the passage of the mass of resistant material of the body (22), so as intimately to embrace part of the body of the metal sections (7A, 7B, 23).

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11.- The panel of claims 6 and 7, wherein some of the metal sections (7A, 7B, 23) are situated lengthwise (23A) and others crosswise (23B) relative to the panel (21), forming a frame arrangement.

12.- The panel of claim 11 wherein the metal sections (7A, 7B, 23) forming the frame arrangement may be accompanied by other metal sections disposed parallel to one and/or the other of the longer and shorter sides of said frame arrangement.

13.- The panel of claim 12, wherein the arrangements of frame and of metal sections parallel to the frame arrangement comprise corrugated rods (16) transversely crossing said frame arrangements and metal sections (7A, 7B), said rods being fixedly attached to points thereof.

14.- The panel of claim 6, wherein the crossmembers (27) of the lattice-like support structure (25) and a part of the reinforcement (23B) of the slabs (22) of the façade panels (21) projecting from the concealed face (22C) thereof are constituted by top-hat-shaped metal sections which are respectively arranged in such a way that, on assembly, said sections are mutually confronting and in engagement by the spines (24, 28) thereof and the latter are provided with an outstanding extension (31) which, in the façade panels (21), forms a wide channel (32) which, in the final assembly position, opens downwardly and which, in the crossmembers (27) of the lattice structure (25), forms a flange (33) which, directed in the opposite direction to said channel (32), is loosely housed therein in the assembly, or vice versa.

15.- The panel of claim 14, wherein the housing clearance (41) in the channel (32) of the reinforcement section (23B) of the façade panel (21) of the flange (33) of the cross member section (27) of the lattice structure (25) is of appropriate magnitude for positionally adjusting the façade panel relative to the adjacent panels in respect both of the vertical and horizontal alignment and of the coplanarity thereof.

16.- The panel of claim 14, wherein the spines (28) of the cross members (27) of the lattice structure (25) and the spines (24) of the reinforcements (23B) of the slabs (22) of the façade panels (21), which are

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substantially mutually contacting, are firmly attached together by mechanical fixation means (30) in the final assembly thereof.

17.- The panel of claim 14, wherein the top-hat-shaped reinforcement section (23B) of the upper side of the frame of the slabs (22) of the façade panels (21) houses longitudinally in the tubular duct (34) it forms with the concealed face (22C) of the slab (22) of the façade panels (21) a loose resilient, resistant filiform member (35) of closed contour, which may be firmly anchored to the lattice structure (25).

18.- The panel of claim 1, wherein the resistant material of the body (22) is preferably one of the group formed by: cement concrete, cement mortar, resin mortar, mixed mortar and synthetic resins, either normal or lightened, alone or in combinations thereof.

19.- The panel of claim 18, wherein the resistant body (22) of the panel (21) may be formed by an inner layer (6A) of a heavy resistant material, for the anchorage of the patterned layer (2, 4) and of part of the metal reinforcement sections (7A, 7B), and an outer layer (6B) of a lightweight resistant material, completing the body, conferring a greater thermal and acoustical insulating power thereon and forming the concealed face of the panel.

20.- The panel of claim 19, wherein the outer layer (6B) of the lightweight resistant material may be preformed as a slab.

21.- The panel of claim 1, wherein the synthetic resin of the layer (2, 49) molded as a shell consists of a gel-coat of a resin of the group which, preferably, is formed by polyesters, polyurethanes, phenolic resins and epoxy resins, either alone or in combination, and incorporating, in all cases, a base coloring agent and, optionally, ornamental and/or distinguishing surface coloring arrangements.

22.- The panel of claim 1, wherein the edges of the sides of the panel (21, 21A) to be placed juxtaposed to those of other panels are provided, at the places on the visible face thereof where the joints (44) cut across the relief of the pattern design, with slightly depressed areas (45, 45A), with those on the edge of one panel (21) mating with those on the adjacent edge of the other panel (21, 21A), which, once the panels (21) are

installed, define depressed façade areas affecting part or the whole of the joint and in which there are fitted inserts (46, 46A) bearing the relief elements of the pattern design constituting the continuation of the relief elements of the pattern design on the visible faces of the juxtaposed panels (21, 21A).

23.- The panel of claim 1, in the case of assembly of internal slabs (36) of plasterboard, fiberboard, etc. between a façade panel (21) and an internal closure slab (36A), jointly to form a wall including an air space (38) and a thermal and acoustical insulation and moisture proofing arrangement (40), wherein the internal slab (36) is applied directly, independently of the façade panel (21), to the support structure (25), in such a way that it occupies one or more cells thereof and is flanked, in any case, by the corresponding upright (26) and transverse (27) sections, to which it is directly solely attached by screws (37) or other means, at the wings thereof.

24.- The panel of claim 23, wherein the internal slabs (36) are at least anchored to end points of the support structure lattice (25), occupying one or more of the cells thereof, in such a way as to replace the conventional braces.

25.- A plant for manufacturing a building panel comprising a track (54) for the movement of carrier devices (51) for the molds forming the façade panel (21) on which there are situated sequentially according to the operative stages required for the manufacture of the façade panel (21), a number of work stations which, defined by the means and/or members pertaining to the work stage proper thereto are listed in order below:

- (a) means for cleaning the molds, appropriate for removing any mortar and mold stripper remains,
- (b) means for changing the molds, to be used when the panel to be manufactured has different features from those of the panel which has been stripped from the mold, which are complemented by shelving for use as a mold store,
- (c) means for applying a mold stripping product over the entire molding surface,

- (d) means for spraying a thin layer of a first resin (gel-coat) which waterproofs and enhances the pattern of the visible face of the panel,
- (e) a tunnel with shelving for storing the molds in the carriers thereof, in stand-by for the curing of the resin sprayed in the molds and/or for the following operation on the mold,
- (f) means for spraying a thin layer of a second anchor resin on the first resin layer,
- (g) means for spraying a layer of coarse sand on the second resin layer, so as partly to incrust the coarse grains of sand in the resin and for removing the sand not adhering thereto;
- (h) a tunnel with shelving for storage of the carriers bearing the molds charged with both resins and the coarse grains of sand incrustated in the second resin, in stand-by for the curing of the second resin and/or the following operation,
- (i) means for pouring cement mortar which is prepared from the cement, aggregate water and additives drawn from silos adjacent the station,
- (j) means for placing the reinforcement in the cement mortar and, optionally, a suspension cable for the panel anchored in said reinforcement,
- (k) a tunnel kiln with shelving for the setting of the cement mortar, and
- (l) mold stripping means and shelving for stacking the finished panels.

26.- The plant of claim 25, wherein when the resins in the façade panel (21) are not used, the sequence of operative work stations is reduced to the following:

- means for cleaning (a) the molding surfaces, appropriate for removing any mortar and mold stripper remains,
- means for applying (c) a mold stripping product over the entire molding surface,

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a tunnel with shelving (h) for storing the molds in the carrier devices thereof, in stand-by for the following operation,
means for pouring (i) cement mortar, which is prepared from the cement, aggregate, water and additives drawn from silos adjacent the station,

means for placing (j) the reinforcement in the cement mortar and, optionally, a suspension cable anchored in said reinforcement,
a tunnel kiln (k) for the setting of the cement mortar, and
mold stripping means (l) and shelving for stacking the finished panels.

27.- The plant of claim 25, wherein the track (54) is disposed in closed circuit form.

28.- The plant of claim 27, wherein the track (54A, 54B) is disposed on a horizontal plane.

29.- The plant of claim 27, wherein the track (54) is disposed in divided form on two superimposed parallel planes.

30.- The plant of claims 27, 28 and 29, which is constituted by two substantially parallel straight portions (54A, 54B) connected at the ends thereof by a work station (h) and/or transport means (55).

31.- The plant of claims 25 and 26, wherein the shelving tunnels (a, k) are provided with means for heating and/or stacking the loaded mold carriers

32.- The plant of claim 25 wherein the track (54) is constituted by a rotary roller path, some of which are motorized.

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